EDITORIAL

A world without statistics?

As a practicing statistician, we frequently are asked questions like: What is the role of statistics in our daily life? Why do we need statistics? What would the world be without statistics? Here are some of my thoughts on these and related matters.

Statistics is an ancient tool which has been useful in solving problems of interest and understanding the world we live in. Until recently, say 60 years ago, in Latin America there was the wrong perception that statistics was an exoteric field that did not relate well to the needs of our society. Also, it was incorrectly thought that statistics was a branch of mathematics of interest only to people in academia. Fortunately, the perception is changing. These days, we find more and more people interested on how and where one could use statistics to the advantage of government, business, sciences, and day to day affairs. Careers and training in statistics are becoming more common in our universities, and statisticians are beginning to play an important role in our society.

Statistics derives its power from the positive impact that it can have when it interacts with other fields like science, business, government, services, and research in general. There are numerous well documented reports for the interdisciplinary added value due to the use of statistics. The reports are on a wide range of applications from Physics (see, Mahon, B. "How Science Got Statistics", Significance, June 2015) to improving the quality of beer (see, https://en.wikipedia.org/wiki/William_Sealy_Gosset). For a very interesting collection of applications in México, see http://www.mundoestadisticacimat.mx/videos.

In principle the idea is to use statistics to make decisions based on uncertainty and limited information. The first hurdle to overcome is to agree to the concept that basically there are no predictable or repeatable processes. That variability is inherent on whatever we observe, measure, or manufacture. Also, to understand that it is unrealistic to expect a complete control of variability, if at all possible, at a reasonable cost. In making decisions under uncertainty there are important considerations: The risk in simplistic terms is function of the probability that the decision is incorrect and the cost due to the incorrect decision. If the risk is too high, it might be the case that we should not assume the risk or take action to decrease the probability or cost (or both) of an incorrect decision. Related, suppose that there is a business decision which carries minor lasting economic repercussions in case of failure, other than the cost of implementing it, but with great competitive advantages if it succeeds. The business opportunity is a function of the probability of a successful decision and the benefits derived from this decision. If the investment to try the new venture is low as compared to potential business opportunity, why not try? In either case, getting a good estimate of the probability of an incorrect (or correct) decision is in the realm of work where good statistics combined with subject matter is paramount.

Interestingly, statistics thrives in moments of crisis. The need of quick response or understanding of undesirable events has shown the important role of statistics in those decision making situations. A few documented cases that come to mind are: the important work of statisticians in breaking the Enigma code and the developing of the A-bomb during World War II, the role of statistics in understanding the problem and finding adequate treatments for HIV patients since this epidemiologic crisis emerged in the 1980s, understanding the root cause for the Space Shuttle Challenger disaster in 1986, and the work of statisticians in the non-destructive evaluation area caused by the current terrorist attacks. Of course, all these examples are high end applications, but statistics is being used today for more mundane purposes like: what is the remaining life of the battery of a pacemaker that a patient has worn for a certain period of time or how to identify those students in their first college year with the highest probability of abandoning their college education. Another important trait of statistics is its evolving nature. It is a field in the making in the sense that the field is driven by change and innovations (i.e., the discipline grows due to the needs of new problems to solve).

We have the challenge and opportunity of forging and building statistical curricula that is useful for our future graduates. Where should we start? This is subject to debate. I am of the opinion that it should be started at the high school level at the latest, but by all means all college students should be exposed to some type of statistics education. Not everybody needs to be a practicing statistician, but at the very minimum, individuals in decision making positions should know when to use statistics or when to bring in statisticians into the decision making process.

Paraphrasing A. Gelman, what would be "A world without statistics?" Well, the world most likely would have not disappeared, but we would not understand it so well, it would not be as confortable, and the quality of life would not be as good.

Finally, for young generations interested in jobs for the future, the track record of statistics in other countries anticipates that in Latin America statistics would be a promising career with good job security, competitive salaries, and friendly working environments.

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